

Final Modification Report

CM097: Electromagnetic Transient (EMT) and Root Mean Square (RMS) Model Submission for Transmission Owners (TOs)

Overview: As Great Britain's (GB) power system moves towards a net zero carbon operation; the number of Inverter-Based Resources (IBR) is expected to increase, with the amount of synchronous generation on the GB power system to decline, which will significantly change the characteristics of the GB network. These changes give rise to the need for more accurate dynamic modelling and the need for analysing the effect of potential control interactions between the devices across the network leading to risks of oscillations and inverter stability.

Modification process & timetable

1	Proposal Form 29 May 2024
2	Workgroup Consultation 25 April 2025
3	Workgroup Report 21 April 2026
4	Code Administrator Consultation 05 May 2026 – 27 May 2026
5	Draft Final Modification Report 16 June 2026
6	Final Modification Report 16 July 2026
7	Implementation In line with GC0168

Have 5 minutes? Read our [Executive summary](#)

Have 60 minutes? Read the full [Final Modification Report](#)

Have 120 minutes? Read the full Final Modification Report and Annexes

Status summary: This report has been submitted to the Authority for them to decide whether this change should happen.

Panel recommendation: The Panel recommended unanimously that the Proposer's solution is implemented.

This modification: is expected to have a: **High impact** for the Transmission System Operator and Transmission Owners (onshore & offshore).

Governance route	Standard Governance modification with assessment by a Workgroup	
Who can I talk to about the change?	Proposer: Frank Kasibante frank.kasibante1@neso.energy	Code Administrator Chair: Claire Goult claire.goult@neso.energy

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Executive Summary

This Energy System Operator (NESO) with Root Mean Square (RMS) and Electromagnetic Transient (EMT) models to enable analysis of issues such as system oscillations, inverter instability and Transient over Voltage (ToV) on the National Electricity Transmission System (NETS). modification seeks to require Transmission Owners (TOs) to provide National

What is the issue?

As Great Britain's power system moves towards net zero carbon operation, the network is transitioning from large synchronous Generators to a large number of smaller Inverter-Based Resources (IBR) which are causing new and varying challenges to the power system, for example control interactions, low fault level, inverter instability and ToV. NESO requires RMS and EMT models from TOs so that it can analyse and understand how these interactions affect the network under different system conditions. There are currently no requirements in the System Owner Transmission Owner Code (STC) for TOs to submit EMT and RMS models of their assets to NESO and for NESO to share these models with relevant Users, as well as enabling NESO to share Users' EMT and RMS models to TOs. This restricts the ability of NESO to perform system studies, modelling and post fault analysis.

What is the solution and when will it come into effect?

Proposer's solution:

The proposed solution is to:

1. Mandate the collection of EMT and RMS models from TOs. Enable the sharing of these TO models with relevant Users and allow NESO to share Users' EMT and RMS models with TOs for conducting studies. These models will contribute to a comprehensive Great Britain (GB) Model, facilitating investigations, post-fault analyses, and planning studies.
2. Create a new STCP (12-2) to specify the model exchange process between TOs and NESO (STCP Modification PM0147).

Implementation date: In line with Modification GC0168: Submission of Electro Magnetic Transient (EMT) Models

What is the impact if this change is made?

There is a high impact for the Transmission System Operator and Transmission Owners (onshore & offshore), through the development of an efficient, economical, and coordinated electricity transmission system; the facilitation of new connections; the efficient discharge of licence obligations; and improved security and reliability of the GB electricity supply.

Workgroup conclusions: The Workgroup concluded unanimously that the Original Solution better facilitated the Applicable Objectives than the Baseline.

Code Administrator Consultation: The Code Administrator Consultation received 02 non-confidential responses.

Panel recommendation: The Panel recommended unanimously that the Proposer's solution is implemented.

Interactions

GC0168: Submission of Electro Magnetic Transient (EMT) Models

CMP456: Cost recovery for legacy plant in relation to GC0168

CMP466: CMP456 Consequential Charging Modification

A separate Modification will be established to introduce a new STCP (STCP Modification PM0147).

What is the issue?

As Great Britain's power system moves towards net zero carbon operation, the network is transitioning from large synchronous Generators to a large number of smaller IBRs which are causing new and varying challenges to the power system, for example control interactions, low fault level, inverter instability and ToV. To address these challenges, NESO requires RMS and EMT models from TOs. These models can help NESO to analyse and understand the impact on the network under various system conditions. There are currently no requirements in the STC for TOs to submit EMT and RMS models of their assets to NESO and for NESO to share these models with relevant Users as well as enabling NESO to share Users' EMT and RMS models to TOs. This restricts the ability of NESO to perform system studies, modelling and post fault analysis.

Why change?

For an evolving system with a high penetration of IBR and thus due to a high penetration of asynchronous generation, EMT and RMS models are required to perform more detailed analysis. This will provide more certainty in the studies and analyses outcomes which will benefit NESO in meeting its legal obligations.

What is the solution?

Proposer's Original solution

The proposed solution is to:

1. Mandate the collection of EMT and RMS models from TOs. Enable the sharing of these TO models with relevant Users and allow NESO to share Users' EMT and RMS models with TOs for conducting studies. These models will contribute to a comprehensive Great Britain (GB) Model, facilitating investigations, post-fault analyses, and planning studies.

2. Create a new STCP (12-2) to specify the model exchange process between TOs and NESO (STCP Modification PM0147).

Workgroup considerations

The Workgroup convened 8 times to discuss the identified issue within the scope of the defect, develop potential solutions, and evaluate the proposal in relation to the Applicable Code Objectives.

The Workgroup held their Workgroup Consultation between 28 March 2025 to 25 April 2025 and received 3 non-confidential responses and 1 confidential response. The full non-confidential responses and a summary of the responses can be found in **Annex 04**.

Workgroup Discussion ahead of the Workgroup Consultation

During the first Workgroup, the Proposer advised Workgroup members Modification CM097 was closely aligned with GC0168 and was looking to achieve the same goal but in a different code.

Legal Text Discussions

The Legal Text for CM097 was reviewed, and suggested amendments were agreed by the Workgroup members.

During discussions, Workgroup members expressed concerns regarding the definitions of EMT Models. Specifically, issues were raised about the accuracy and comprehensiveness of the current definition, emphasising the need for precise wording to avoid ambiguity. One Workgroup member remarked that the existing definition might be too detailed and may not accurately represent all EMT Models. The Proposer noted that RMS and EMT have not yet been defined in the Grid Code and confirmed that they would align the definitions to those found in STCP Modification PM0147.

Cost Recovery Mechanism

Workgroup members discussed cost recovery mechanisms for both TOs and Offshore Transmission Owners (OFTOs). It was identified that NESO needed to consult with their legal team and the Authority would review existing arrangements and address potential issues, particularly for OFTOs who lack a formal price control mechanism. A Workgroup member advised that incumbent Transmission Owners (NGET, SPT, and SHETL) do not have a specific mechanism in place for cost recovery associated with the provision of RMS and EMT models to NESO.

A Workgroup member highlighted that the current income adjustment clauses within the Offshore transmission licences only allow cost recovery between £500k and £4 million, which is deemed insufficient for the anticipated expenses. It was suggested that this mechanism does not adequately support TOs and proposed introducing a contingent event clause within the license as a potential solution for cost recovery. This clause would enable TOs to recover costs in specific contingent events, providing a more satisfactory mechanism.

During Workgroup 5, the Proposer provided an update to the Workgroup on their discussions with Ofgem and referred the Workgroup to an Ofgem letter that had been shared in the Workgroup Papers. Ofgem confirmed that they're consulting internally to assess if onshore TOs could have cost recovery arrangements covered and would provide an update in due course.

The Workgroup discussed offshore and onshore cost recovery and compensation arrangements. One Workgroup member raised concerns about a reference in the Ofgem letter to a threshold of £1m per annum for OFTO cost recovery, suggesting that it could lead to insolvency if mismanaged.

The Proposer and other Workgroup members will meet with Ofgem to discuss cost recovery issues and provide an update at a later Workgroup meeting. The action will remain open pending results of these discussions.

Draft STCP

Workgroup members reviewed and made comments on a draft STCP 12-2 that was shared by the Proposer, it was agreed that amendments were to be made before the STCP proposal was submitted to STC Panel.

Workgroup members deliberated on the necessity for User manuals, Dynamic Performance Studies (DPS) reports, and validation reports. The Proposer agreed to address these concerns separately and to conduct a detailed review of the model validation and documentation requirements. Workgroup members agreed that the modelling team from NESO would initiate discussions to provide clearer guidance in the updated document. The STCP would follow the normal governance route. A modification PM0147 was raised subsequently.

Guidance Notes/Electrical Standards

Further discussions were held regarding the distinction between guidance notes and electrical standards. Workgroup members emphasised the need for clarity in the proposed STCP 12-2 documentation, as lack of distinction of references could lead to confusion. The Proposer agreed to collaborate with NESO colleagues to make the necessary updates to the draft STCP 12-2 to ensure clarity and accuracy.

Workgroup Consultation Summary

The Workgroup held their Workgroup Consultation between 28 March 2025 to 25 April 2025 and received 3 non-confidential responses and 1 confidential response. The full responses and a summary of the responses can be found in **Annexes 04** and **Annex 05**.

Objectives which the Proposer's solution better facilitates the Applicable STC Objectives than the baseline:

One respondent chose objective (a), one respondent chose objective (b), two respondents chose objective (c), three respondents chose objective (e), two respondents chose objective (g), and one respondent chose objective (h).

Support for implementation approach:

Two respondents were supportive of the chosen implementation approach, with one respondent noting that detailed requirements will be included in a separate STCP ([Modification PM0147](#)), making a full assessment difficult. They also highlight significant costs and timescales for obtaining EMT models for existing plants and support a cost recovery mechanism.

One respondent was not supportive of the chosen implementation approach, citing the following reasons:

- Data Availability: Most OFTO sites lack necessary data, especially older assets.
- Time Commitment: Significant time needed, can't be done immediately.
- Resource Diversion: Diverts resources from other important work.
- Necessity: Requirement should be justified based on need and cost.
- Existing Data: NESO may already have much of this data.
- Cost Recovery: Costs should be recoverable, but high threshold may not be met.
- Technical Challenges: OFTOs need resources they were never funded for.

Draft Legal Text:

All respondents were satisfied that the draft Legal Text satisfied the intent of the modification, with one respondent noting that the majority of the detail will be contained in [STCP Modification PM0147](#).

Cost-recovery mechanism:

All respondents confirmed that they were supportive of a cost-recovery mechanism. The first respondent stated that they supported a cost recovery mechanism for TOs in respect of provision of EMT models for already connected equipment. For the established onshore TOs (NGET, SPT, and SHETL) the price

control arrangements in their licences could be used for this purpose. However, for OFTOs it is unclear how the cost recovery mechanism would work, and they do not believe it would be necessary for a cost recovery for new plant going forward. As Competitively Appointed Transmission Owners (CATOs) are a new concept, they do not believe it would be necessary for a cost recovery mechanism for a new plant going forward.

The second respondent highlighted the need for a cost recovery mechanism to ensure that TOs can recover legitimate additional costs incurred in obtaining EMT models for existing plant. They stated that for all new plant, their organisation already requires the delivery of RMS and EMT models as part of the specification. However, the costs associated with obtaining EMT models for existing plant are very high. Based on work that is ongoing, the total cost to their organisation is estimated to be in the order of £500k, not including the engineering time to test such models before submitting them to NESO. For TOs with a higher number of Flexible AC Transmission Systems (FACTS) devices and other active plant, this cost will be substantially higher. The absence of a cost recovery mechanism would, as a minimum, slow down the process of acquiring validated EMT models for GB plant.

The third respondent was supportive of a cost-recovery mechanism but noted that the cumulative impact of many small changes is gradually affecting the belief that the OFTO regime is low-risk. They stated that implementing this modification without funding will result in a longer and less technically competent process, suggesting a cost-benefit analysis for providing the data, as NESO's assumption that this comes at no cost will not lead to the best decision for the whole industry. They highlighted that the decision should consider the impact on the entire industry, rather than focusing solely on individual TOs.

Signposting Electrical Standard detailing how an EMT model would be submitted in Power System Computer Aided Design (PSCAD) Version 5:

All respondents agreed that with appropriate signposting to the Grid Code from the STC, the proposal to prepare an Electrical Standard detailing how an EMT model would be submitted in PSCAD Version 5, would be an appropriate and cost-effective method of providing this guidance to transmission licences.

The first respondent confirmed that they agreed with the proposed approach, for PSCAD Version 5 or higher.

The second respondent favoured an approach based on open standards and interoperability between simulation platforms, rather than binding the industry to a single vendor and simulation platform. The noted existing standards such as Functional Mock-up Interface (FMI) and the approach developed by IEEE and CIGRE.

The third respondent confirmed that this proposal is in line with several similar situations from STC to Grid Code. They noted that governance of the Grid Code is independent to the STC and there have been issues in the past with the Grid Code Review Panel making changes to Grid Code documents which impact on the STC, without input from the STC community.

Alternative Requests: One respondent indicated that they wished to raise an Alternative Request.

The responses received in the Workgroup Consultation, the related issues raised in Workgroup discussions, and the subsequent decisions made by Workgroup members are all addressed in the 'Workgroup Discussion post Workgroup Consultation' section below.

Workgroup Discussion post Workgroup Consultation

Other options/Alternatives

The Proposer of Alternative Request following the Workgroup Consultation talked the Workgroup through their proposal. They noted that their proposal recognises the significant cost and engineering resource needed to deliver the Original Proposal and suggested a more pragmatic approach, where the highest priority items are delivered first.

The Alternative Proposer noted that instead of an absolute obligation to submit models, their Alternative suggests that there should be a prioritisation based on the necessity and cost-effectiveness of each submission. This emphasises that not all networks require the same level of modelling, especially older and smaller networks that may not have the necessary equipment or models available. They also raised concerns about the potential delays in fulfilling the obligations of the Original Proposal, which could lead to breaches if not managed properly.

The Workgroup discussed the importance of obtaining necessary data without incurring excessive costs and recognised the challenges posed by the offshore transmission process, which often leads to a lack of direct relationships with original developers of the equipment.

The Alternative Proposer and Workgroup members provided insights into the model collection process, suggesting the establishment of a clear priority list for model submissions based on current system challenges. They discussed a structured approach for users to submit existing models within three months, while new models would have a nine-month timeline for development.

The Alternative Proposer noted that regions facing significant issues, such as Sub-Synchronous Oscillations (SSO) challenges, could be prioritised with a clear rationale for prioritisation. This structured approach would seek to ensure

that the most critical models are addressed first, promoting efficiency and effectiveness in the modelling process.

The Workgroup discussed a draft Guidance Note on EMT, shared by the NESO SME. The Workgroup discussed governance issues relating to the incorporation of this guidance into existing frameworks such as the Grid Code and STCP. The Proposer and NESO SME took an action to consider how to incorporate the Guidance Note into STCP 12-2 and if/how this impacts CM097.

The Alternative Proposer committed to consider the points raised during the Workgroup discussion and submitted a refined Alternative proposal (**Annex 05**). The updated Alternative proposal highlights concern regarding the limited availability of Electromagnetic Transient (EMT) data for most Offshore Transmission Owner (OFTO) sites, especially older ones, as manufacturers may not possess the data or may no longer exist. Acquiring the necessary information could require costly commercial agreements and significant internal resources, which cannot be completed swiftly or by a fixed deadline. It is suggested that obligations to provide such data should be based on actual need and cost, rather than applied universally. Furthermore, NESO might already hold relevant data via the OTSDUW process, and obtaining OEM controller models often involves NDAs and, sometimes, less detailed models due to confidentiality.

Further to Workgroup's advice, NESO proposed to include an appendix in the STCP 12-2, RMS and EMT model requirements and the approach & process for retrospective submission.

NESO SMEs shared the updated STCP 12-2 and Appendix B with the Proposers of the Alternative. The Alternative Proposers indicated that the proposed modification, together with the supporting STCP and Appendix B, satisfactorily addresses the concerns identified in the Alternative Proposal, with the exception of cost recovery. A similar approach has been applied for Users in CMP456/CMP466 and can be considered for STC parties.

The Alternative Proposer noted extensive reference to controller models, active power control, IBRs, synchronous generators, and users. These references seem irrelevant to the guidance note, as TO models should only address their own assets, not generators. NESO SMEs concurred with this recommendation and resolved to revise STCP 12-2 and Appendix B to explicitly clarify the intended references.

The second concern raised by the Alternative Proposer was that Transmission Operators (TOs) are required to have a model maintenance and support framework with vendors or suppliers throughout the asset's lifetime. The Alternative Proposer argued this is not something that can be mandated in the STCP, as it is a business decision about meeting obligations and suggested further rewording for clarification. NESO SMEs agreed to revise the STCP 12-2 and Appendix to address this concern.

After conducting offline consultations with SMEs, the Proposer of the Alternative confirmed that if the revisions made to STCP 12-2 and its Appendix were deemed satisfactory, then the Alternative proposal would become unnecessary. The Alternative Proposer requested that it be noted that concerns regarding cost recovery mechanisms for both model development and ongoing support frameworks remain unresolved.

The Alternative Proposer stated that while they supported the principle of providing models, the mechanism for recovering these costs was not addressed within CM097 and should be highlighted transparently rather than resolved within this modification.

STCP 12-2 and Appendix B Review

Appendix B

A Workgroup member noted that there were inconsistencies in Appendix B, as it contained references to both 20 seconds and 50 seconds for the required simulation duration. The NESO SME confirmed that the document would be

updated so that the time requirement is consistently stated as 50 seconds, aligning with the relevant Grid Code provision.

The Workgroup member also raised concerns regarding clarity on percentage deviation requirements, noting ambiguity as to whether this related to rated megawatts or initial reference values. The NESO SME confirmed that the wording would be clarified to ensure the requirement is correctly described.

The Workgroup member also noted inconsistent use of time units in the document, with the NESO SME agreeing to amend the document to ensure consistency.

A question was raised about whether mentions of Grid Code requirements might be interpreted as extending beyond TOs. The NESO SME clarified that the plan is to revise the wording so it's clear these requirements apply only to TOs.

Clarification was requested regarding 'User specific RMS models,' especially with respect to library, modified library, and DLL-based models. The NESO SME confirmed that DLL based RMS models are not acceptable and that the drafting would be updated to clarify that DLL-based RMS models are excluded and confirm what is meant by 'User specific RMS models. The Workgroup agreed that further clarification in the document is required.

A Workgroup member asked whether RMS model submission requirements had previously been captured through earlier Grid Code modifications. The Proposer stated that this would need to be checked, including whether any consequential STC modifications arose from [GC0141](#). The Chair noted this will need to be confirmed.

The Proposer later explained that Appendix B would be incorporated into STCP 12-2 to create a single consolidated document. They confirmed that the STCP content was aligned with Grid Code material, noting that Grid Code guidance currently covered EMT only, whereas the STCP addressed both EMT and RMS.

STCP 12-2

Workgroup members raised concerns regarding the wording used on sharing TO models with Users, particularly around intellectual property and liability. The NESO SME clarified that any sharing would be subject to Non-Disclosure Agreements (NDAs) between OEMs, third parties, and NESO, and would be limited to defined purposes such as connection studies. The Proposer noted that Schedule 3 of the STC already contains confidentiality provisions that should be considered in relation to this point. The Workgroup agreed that the drafting should provide greater clarity on safeguards and on the reciprocal nature of model sharing.

Later discussions highlighted ongoing concerns regarding IP constraints, NDAs, and the burden of providing additional models solely for sharing purposes. The Proposer stated that the issue would need further consideration, including whether additional mechanisms might be required to address IP limitations without creating disproportionate obligations.

The document demonstrates inconsistent usage of the terms ‘Users’ and ‘Network Assets,’ which may lead to ambiguity. A Workgroup member clarified that ‘Users’ has a specific meaning in the STC that is distinct from TOs. The Workgroup agreed that this terminology should be applied consistently and accurately. The NESO SME will review and correct consistency of terminology throughout the document.

Further discussions around TOs highlighted that the drafting seemed to imply TOs would be required to indicate acceptance or rejection of user models submitted by NESO. The Proposer clarified that this was not the intent and that TOs were not expected to undertake compliance assessments. The Workgroup agreed that the drafting should better reflect reciprocal responsibilities between sending and receiving parties.

Subsequent discussions on the clarity of Legal text drafting saw concerns raised that it did not clearly describe expectations for DPS-style reports, validation reports, and supporting documentation. The

Proposer noted that the relevant expectations were already set out in Appendix B but proposed amending the drafting of STCP 12-2 to directly reference Appendix B.

A Workgroup member raised concerns about model submission timelines, particularly for projects already contracted or delivered significantly after the modification. The Proposer confirmed that the drafting was not intended to apply retrospectively and that the wording ‘unless otherwise agreed’ was intended to allow for pragmatic, case-by-case agreement.

The Proposer of the Alternative Request confirmed that their previous concerns had been addressed in the updated STCP 12-2 draft Legal Text and they were content to formally withdraw their Alternative Request.

The revised STCP 12-2 and Appendix B (**Annex 07**) were shared with Workgroup members prior to Workgroup Meeting 8.

Terms of Reference Overview

a. Implementation; Implementation has been detailed in STCP 12-2. Workgroup members have been central to its drafting (Annex 07).
b. Review and support the Legal Text drafting; Legal Text has been robustly discussed during Workgroup meetings, all attended with quoracy (Annex 03).
c. Ensure the appropriate Industry experts or stakeholders are engaged in the Workgroup to ensure that all potentially affected stakeholders have the opportunity to be represented in the Workgroup; All affected stakeholders (apart from CATOs, who are not yet operational at the time of CM097) have been represented and their expert representatives have contributed actively towards discussions regarding impacts (Annex 08).

d. The cross Code impacts this Modification has, in particular the CUSC;

This modification has no direct impact to the CUSC. However, the leading Grid Code modification GC0168 has also driven Industry stakeholders to raise CUSC Modifications CMP456/CMP466 to address cost recovery (Pages 4, 6, 12, 15, and 21).

e. Consider STCP 12-2 alongside CM097;

CM097 Workgroup members have been central in drafting STCP 12-2 (**Annex 07** and Pages 6-9, 12-15).

f. Consider how to produce/gather models for existing assets;

The STCP 12-2 has considered this (**Annex 07**).

g. Assess the materiality of costs/resources needed for STC Parties to comply with additional requirements brought forward by the Proposer's solution;

Materiality has been discussed extensively by Workgroup. Separate sessions have been held with the Regulator to seek guidance which has been provided (Pages 7-10).

h. Compliance with the Electricity Regulation and any Relevant Legally Binding Decisions of the European Commission and/or the Agency.

Workgroup members agreed that there were no assessed compliance issues (Page 19).

What is the impact of this change?

There is a high impact for the Transmission System Operator and Transmission Owners (onshore & offshore), through the development of an efficient, economical, and coordinated electricity transmission system; the facilitation of new connections; the efficient discharge of licence obligations; and improved security and reliability of the GB electricity supply.

Original Proposer's assessment against Code Objectives

Original Proposer's assessment against STC Objectives	
Relevant Applicable Objective	Identified impact
(a) efficient discharge of the obligations imposed upon Transmission Licensees by Transmission Licences and the Electricity Act 1989;	Positive NESO and TOs will have the ability to meet their licence obligations relating to operating the system securely.
(b) efficient discharge of the obligations imposed upon the licensee by the Electricity System Operator licence, the Energy Act 2023 and Electricity Act 1989;	Neutral
(c) development, maintenance, and operation of an efficient, economical, and coordinated system of electricity transmission;	Positive EMT and RMS models for TO assets, for assets with Power Electronic Devices, will facilitate system analysis and enable to operate the evolving and future system with anticipated high penetration of IBR resources. This will enable achievement of an efficient, economical and coordinated electricity transmission system.
(d) facilitating effective competition in the generation and supply of electricity, and (so far as consistent therewith)	Neutral

facilitating such competition in the distribution of electricity;	
(e) protection of the security and quality of supply and safe operation of the National Electricity Transmission System insofar as it relates to interactions between Transmission Licensees and the licensee*;	Positive EMT and RMS models for TO assets, for assets with Power Electronic Devices, will facilitate system analysis and enable to operate the evolving and future electricity system.
(f) promotion of good industry practice and efficiency in the implementation and administration of the arrangements described in the STC;	Positive The availability of EMT and RMS models from TOs will help NESO to analyse the impact of potential new connections to the system and undertake post-system incident analysis. This will identify any modifications and / or control measures required to operate the system.
(g) facilitation of access to the National Electricity Transmission System for generation not yet connected to the National Electricity Transmission System or Distribution System; and	Neutral
(h) compliance with the Electricity Regulation and any Relevant Legally Binding	Neutral

Decisions of the European Commission and/or the Agency.	
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* See Electricity System Operator Licence

Stakeholder / consumer benefit categories		Proposer's view
Improved safety and reliability of the system		Positive NESO will be able to carry out pre-fault and post-fault analysis studies when provided with EMT and RMS models by TOs. The outputs will inform accurate operational decisions in the interest of safety and reliability of the system.
Lower bills than would otherwise be the case		Neutral
Benefits for society as a whole		Neutral
Reduced environmental damage		Neutral

Workgroup Vote

The Workgroup met on 08 April 2026 to carry out their Workgroup Vote. The full Workgroup Vote can be found in **Annex 06**. The table below provides a summary of the Workgroup Members view on the best option to implement this change.

For reference, the Applicable STC Objectives are:

- a. Efficient discharge of the obligations imposed upon Transmission Licensees by Transmission Licences and the Electricity Act 1989;
- b. Efficient discharge of the obligations imposed upon the licensee by the Electricity System Operator licence, the Energy Act 2023 and Electricity Act 1989;
- c. Development, maintenance, and operation of an efficient, economical, and coordinated system of electricity transmission;
- d. Facilitating effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the distribution of electricity;
- e. Protection of the security and quality of supply and safe operation of the National Electricity Transmission System insofar as it relates to interactions between Transmission Licensees and the licensee*;
- f. Promotion of good industry practice and efficiency in the implementation and administration of the arrangements described in the STC;
- g. Facilitation of access to the National Electricity Transmission System for generation not yet connected to the National Electricity Transmission System or Distribution System; and
- h. Compliance with the Electricity Regulation and any Relevant Legally Binding Decisions of the European Commission and/or the Agency.

* See Electricity System Operator Licence

The Workgroup concluded unanimously (out of 5 votes) that the Original better facilitated the Applicable Objectives than the Baseline.

Option	Number of voters that voted this option as better than the Baseline
Original	5

Code Administrator Consultation Summary

The Code Administrator Consultation was issued on the 5 May 2026 closed on 27 May 2026 and received 02 non-confidential responses and 0 confidential responses. A summary of the responses can be found in the table below, and the full responses can be found in **Annex 10**.

Code Administrator Consultation summary	
Question	
Do you believe that the CM097 Original Proposal better facilitates the STC Applicable Objectives?	One respondent felt the Original Proposal better facilitates the Applicable Objectives (c) and (e) as the collation of EMT and RMS models from TOs will help with the management of and understanding of system issues on the NETS. The other respondent agreed the proposal better facilitates the Applicable Objectives (c) and (e) but considered the proposal also better facilitates (a), (b), (g) and (h).
Do you support the proposed implementation approach?	Both respondents supported the implementation approach. One respondent explained how the proposal mandates the collection of EMT and RMS models from TOs, while other modifications (GC0168 and

	PM0147) will facilitate the implementation, including the introduction of a new STCP (12-2) setting out the procedures to ensure that The Company and relevant TOs remain fully coordinated in managing and exchanging RMS and EMT models.
Do you have any other comments?	One respondent stated that accurate models are essential to improving overall modelling capability, which they considered would support greater system optimisation, enhance system security, and reduce costs for consumers.
Legal text issues raised in the consultation	
No legal text issues were raised. No legal text issues were raised with the current text. Some additional typographical changes were added.	

Panel Recommendation vote

The Panel met on the 24 June 2026 to carry out their recommendation vote.

They assessed whether a change should be made to the STC by assessing the proposed change and any alternatives against the Applicable Objectives.

Panel comments on Legal text

Ahead of the vote taking place, the Panel considered the legal text amendments proposed as part of the Code Administrator Consultation and agreed that they were typographical. The changes made can be found in **Annex 03**.

Vote 1: Does the Original, facilitate the Applicable Objectives better than the Baseline?

Panel Member: **Gareth Williams, Scottish Power Transmission**

Overall (Y/N)	Better facilitates STCO (h)?	Better facilitates STCO (g)?	Better facilitates STCO (f)?	Better facilitates STCO (e)?	Better facilitates STCO (d)?	Better facilitates STCO (c)?	Better facilitates STCO (b)?	Better facilitates STCO (a)?	
Neutral	Neutral	Neutral	Neutral	Yes	Neutral	Neutral	Yes	Neutral	Original
Voting Statement									
By ensuring that both NESO and the TOs have access to the appropriate RMT and EMS models will ensure that the transmission system continues to be developed and operated in a secure, efficient, economical and coordinated manner.									

Panel Member: **Harriet Eckweiler, Scottish Hydro Transmission**

Overall (Y/N)	Better facilitates STCO (h)?	Better facilitates STCO (g)?	Better facilitates STCO (f)?	Better facilitates STCO (e)?	Better facilitates STCO (d)?	Better facilitates STCO (c)?	Better facilitates STCO (b)?	Better facilitates STCO (a)?	
Yes	Neutral	Neutral	Yes	Yes	Neutral	Yes	Yes	Yes	Original
Voting Statement									
We support CM097 on the basis that mandating the submission of EMT and RMS models by the TO will improve the consistency and completeness of system									

modelling. The introduction of clear EMT and RMS model requirements, including for retrospective submissions, will improve model quality and confidence in their use. Making these models available within the wider GB system will enhance system analysis, investigation, and future planning, thereby supporting the safe, secure, and reliable operation of the transmission system.

Panel Member: **Mike Lee, Offshore Transmission (OFTO)**

Original	Better facilitates STC (a)?	Better facilitates STCO (b)?	Better facilitates STCO (c)?	Better facilitates STCO (d)?	Better facilitates STCO (e)?	Better facilitates STCO (f)?	Better facilitates STCO (g)?	Better facilitates STCO (h)?	Overall (Y/N)
Original	Yes	Yes	Yes	Neutral	Yes	Neutral	Neutral	Neutral	Yes
Voting Statement									
We are supportive of the overall objective of the modification as it will enhance the ability to model the system effectively and support greater low carbon technologies onto the system. An alternative proposal was raised and was able to be withdrawn through refinement of the original proposal and proposed additional STCP. However, the outstanding point regarding the OFTO's cost recovery for meeting the new modelling obligations remains to be addressed, noting that the Income Adjusting Event mechanism in the OFTO licence is not an appropriate way of recovering multiple, significant cumulative cost events.									

Panel Member: **Ben Sayah, National Grid Electricity (NGET)**

Original	Better facilitates STC (a)?	Better facilitates STCO (b)?	Better facilitates STCO (c)?	Better facilitates STCO (d)?	Better facilitates STCO (e)?	Better facilitates STCO (f)?	Better facilitates STCO (g)?	Better facilitates STCO (h)?	Overall (Y/N)
Original	Neutral	Neutral	Yes	Neutral	Yes	Yes	Yes	Neutral	Yes
Voting Statement									
We support the change as codifying TO obligations to submit EMT and RMS models will help improve NESO's consistency and completeness of system modelling. Making models of the wider GB system more widely available will enhance system analysis, investigation and future planning. The change will better support efficient, economical, safe, secure and reliable transmission system.									

Panel Member: **Claire Newton, NESO**

Original	Better facilitates STC (a)?	Better facilitates STCO (b)?	Better facilitates STCO (c)?	Better facilitates STCO (d)?	Better facilitates STCO (e)?	Better facilitates STCO (f)?	Better facilitates STCO (g)?	Better facilitates STCO (h)?	Overall (Y/N)
Original	Yes	Neutral	Yes	Neutral	Yes	Yes	Neutral	Neutral	Yes
Voting Statement									
CM097 requires the provision of EMT and RMS models from Tos, with further detail contained in STCP 12-2, as part of PM0147. Accurate models are essential for NESO in strengthening overall modelling capability to be able to conduct analysis for a power system with an increasing penetration of Inverter Based Resource (IBR). This will result in greater system optimisation, enhance system security, and deliver lower costs for consumers.									

Vote 2 – Which option best meets the Applicable Objectives?

Panel Member	Best Option	Which objectives does this option better facilitate? (If baseline not applicable).
Gareth Williams	Original	a), e)
Harriet Eckweiller	Original	a), b), c), e), f)
Mike Lee	Original	a), b), c), e)
Ben Sayah	Original	c), e), f), g)
Claire Newton	Original	a), c), e), f)

Panel Conclusion

The Panel recommended unanimously that the Proposer's solution is implemented.

When will this change take place?

Implementation date

In line with [GC0168](#).

Date decision required by

TBC

Implementation approach

No systems will have to change because of this modification.

Interactions

☒ Grid Code ☐ BSC ☐ CUSC ☐ SQSS
☐ European ☒ Other ☐ Other
 Network Codes modifications

Reference Material

[GC0168 Submission of Electro Magnetic Transient \(EMT\) Models](#)

[CMP456: Cost recovery for legacy plant in relation to GC0168](#)

[CMP466: CMP456 Consequential Charging Modification](#)

A separate modification will be established to introduce a new STCP ([STCP Modification PM0147](#)).

Acronyms, key terms and reference material

Acronym / key term	Meaning
CATO	Competitively Appointed Transmission Owner
DPS	Dynamic Performance Studies Report

EMT	Electromagnetic Transient
FACTS	Flexible AC Transmission Systems
FMI	Functional Mock-up Interface
GB	Great Britain
GC	Grid Code
IBR	Inverter Based Resources
NESO	National Energy System Operator
OFTO	Offshore Transmission Owner
PSCAD	Power System Computer Aided Design
RMS	Root Mean Square
SQSS	Security and Quality of Supply Standards
SSO	Sub-Synchronous Oscillations
STC	System Operator Transmission Owner Code
STCP	System Operator Transmission Owner Code Procedure
TO	Transmission Owner
ToR	Terms of Reference
ToV	Transient over Voltage
T&Cs	Terms and Conditions

Annexes

Annex	Information
Annex 01	CM097 Proposal Form

Annex 02	CM097 Terms of Reference
Annex 03	CM097 Final Legal Text
Annex 04	CM097 Workgroup Consultation Responses and Summary
Annex 05	CM097 Alternative Request
Annex 06	CM097 Workgroup Vote
Annex 07	CM097 Draft STCP 12-2
Annex 08	CM097 Workgroup Attendance Record
Annex 09	CM097 Workgroup Action Log
Annex 10	CM097 Code Administration Consultation Responses